Exam 2 Review
Structures
11/13/07

How to study for exam

- Review chapters 5 - 10 in your book, *Understanding Structures*
- Review ppt presentations S5 – S8 on website [www.sos.siena.edu/~mmccolgan/Structures/Schedule.html](http://www.sos.siena.edu/~mmccolgan/Structures/Schedule.html)
- Review solutions for Homework 3
- Review Reading Quizzes 4 – 7
- Recall movies shown in class
  - Geodesic domes – Fuller
  - Falling Water
  - World Trade Center
  - Tacoma Narrows Bridge collapse

Topics to discuss

- Exam Details
- Review Book Chapters
- Review ppt slides
- Terminology
- Review Homework #3
- Movies

Details about Exam 2

- Thursday, November 15
- 10 multiple choice questions
  - 2 points each
- 6 short answer questions
  - 5 points each
- Total points
  - 50 points
- Exam 2 counts for 15% of total grade
### Book Chapters
- Chapter 5 and 6 Space Frames and Geodesic Domes
- Chapter 7 Columns and Bearing Walls
- Chapter 8 Beams and Slabs
- Chapter 9 Frames
- Chapter 10 Catenary Cables and Suspension Bridges

### Terminology
- Columns and Bearing Walls
- Buckling vs. Crushing
- Platonic solids – which ones used in building
- Geodesic Domes and Space Frames
- Concrete Slabs
- Short vs. continuous beams
- Cantilever
- Pilasters
- Lintels
- Types of Frames
- Bays and their layout
- Funicular
- Catenary
- Horizontal thrust in cables

### Math Problems
- Beam deflection varies with
  - Span (length)
  - Width
  - Depth
  - Material modulus of elasticity

### Math Problems
- Proportionalities
  \[ \Delta \text{deflection} = \left( \frac{L}{L} \right)^3 \text{, where } L \text{ is the length of the beam} \]
  \[ \Delta \text{deflection} = \left( \frac{W}{W} \right)^4 \text{, where } W \text{ is the width of the beam} \]
  \[ \Delta \text{deflection} = \left( \frac{D}{D} \right)^5 \text{, where } D \text{ is the depth of the beam} \]
  \[ \Delta \text{deflection} = \left( \frac{E}{E} \right)^6 \text{, where } E \text{ is the modulus of elasticity of the beam} \]
Math Problems

- A piece of lumber is 1\text{"} \times 4\text{"} \times 36\text{"}. If it rests on its 4\text{"} side, it deflects 1\text{"} under a heavy load. If it rests on its 1\text{"} side instead, how much will it deflect?

\[
\Delta \text{deflection} \propto \left( \frac{W_f}{W_i} \right)^{\frac{1}{4}} = 4
\]

\[
\Delta \text{deflection} \propto \left( \frac{D_f}{D_i} \right)^{\frac{1}{4}} = 64
\]

Total change in deflection = \(4 \times \frac{1}{64} = \frac{1}{16}\)

New deflection = 1\text{"} \times \frac{1}{16} = \frac{1}{16} \text{"}